

The opinion in support of the decision being entered today  
is *not* binding precedent of the Board.

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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*Ex parte* THOMAS ALAN TAYLOR,  
DANNY LEE APPLEBY and  
ANN BOLCAVAGE

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Appeal 2007-4238  
Application 10/051,228  
Technology Center 1700

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Decided: November 30, 2007

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Before BRADLEY R. GARRIS, JEFFREY T. SMITH, and  
LINDA M. GAUDETTE, *Administrative Patent Judges*.

SMITH, *Administrative Patent Judge*.

DECISION ON APPEAL

This is an appeal under 35 U.S.C. § 134 from a final rejection of claims 1, 3, 4, 9-13, 17-22, 24-28, 33 and 38. We have jurisdiction under 35 U.S.C. § 6.

WE AFFIRM.

Claim 1 is illustrative:

1. A multilayer ceramic coating for providing thermal barrier protection to a gas turbine outer air seal that opposes a blade tip or knife edge, said multilayer ceramic coating comprising an inner ceramic layer coating the gas turbine outer air seal, the inner ceramic layer having a plurality of macrocracks distributed throughout the inner ceramic layer, wherein the macrocracks comprise vertical segmentation macrocracks that extend at least one half the thickness of the inner ceramic layer and there are from about 7.5 to 75 vertical macrocracks per linear centimeter of coating width, and an outer ceramic abradable layer coating the inner ceramic layer, the outer ceramic abradable layer being substantially free of vertical macrocracks, and wherein said multilayer ceramic coating has a high speed tip-to-seal wear ratio of 0.1 or less, a thickness of at least about 0.2 mm, and cyclic thermal shock resistance up to a temperature of at least about 2500°F.

The Examiner relies on the following references in rejecting the appealed subject matter:

Taylor	5,073,433	Dec. 17, 1991
Gupta	5,403,669	Apr. 4, 1995
Good	6,358,002 B1	Mar. 19, 2002
Graham	6,432,487 B1	Aug. 13, 2002

Claims 1, 3, 4, 9-13, 17-22, 24-28, 33 and 38 stand rejected under 35 U.S.C. § 103(a) as follows:

- I. Claims 1, 3, 4, 9-13, 17-22, 24-28, 33, and 38 stand rejected over Taylor in view of Graham.
- II. Claims 1, 3, 4, 9-13, 17-22, 24-28, 33, and 38 stand rejected over Taylor in view of Good.

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III. Claim 26 stands rejected over Taylor in view of Graham and Gupta.

IV. Claim 26 stands rejected over Taylor in view of Good and Gupta.

Based on the contentions of the Examiner and the Appellants, the issue before us is:

(1) Has the Examiner made accurate and sufficient factual findings such that it is reasonable to conclude that one of ordinary skill in the art would have been motivated to utilize an additional (abradable) coating on the thermal barrier coating of Taylor within the meaning of 35 U.S.C. § 103?

(2) Have Appellants presented evidence sufficient to overcome the rejection under § 103?

We answer the first question in the affirmative and the second question in the negative.

We have thoroughly reviewed each of Appellants' arguments. However, we are in full agreement with the Examiner that the claimed subject matter is unpatentable over the cited prior art. Accordingly, we will sustain the Examiner's rejections for the reasons set forth in the present record. We add the following.<sup>1</sup>

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<sup>1</sup> Appellants' arguments presented for the stated rejections are substantially the same. That is, Appellants contend the Graham, Good, and Gupta references do not make up for the deficiencies of the Taylor reference (Br. 11, 14, 16, 17, 20, and 21). Appellants have not presented separate arguments for the rejected claims. The arguments presented for claim 26 are substantially the same as those presented for the rejections of the remaining claims. That is, Appellants have not specifically argued the limitations of claim 26. Appellants' arguments regarding the Gupta reference are directed to the subject matter of the independent claim and do not address the

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Under 35 U.S.C. § 103, the factual inquiry into obviousness requires a determination of: (1) the scope and content of the prior art; (2) the differences between the claimed subject matter and the prior art; (3) the level of ordinary skill in the art; and (4) secondary considerations. *Graham v. John Deere Co. of Kansas City*, 383 U.S. 1, 17-18 (1966). “[A]nalysis [of whether the subject matter of a claim would have been obvious] need not seek out precise teachings directed to the specific subject matter of the challenged claim, for a court can take account of the inferences and creative steps that a person of ordinary skill in the art would employ.” *KSR Int’l Co. v. Teleflex, Inc.*, 127 S. Ct. 1727, 1740-741 (2007) (quoting *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006)). See *DyStar Textilfarben GmbH & Co. Deutschland KG v. C.H. Patrick Co.*, 464 F.3d 1356, 1361 (Fed. Cir. 2006) (“The motivation need not be found in the references sought to be combined, but may be found in any number of sources, including common knowledge, the prior art as a whole, or the nature of the problem itself.”); *In re Bozek*, 416 F.2d 1385, 1390 (CCPA 1969) (“Having established that this knowledge was in the art, the examiner could then properly rely, as put forth by the solicitor, on a conclusion of obviousness ‘from common knowledge and common sense of the person of ordinary skill in the art without any specific hint or suggestion in a particular reference.’”); *In re Hoeschele*, 406 F.2d 1403, 1406-407 (CCPA 1969) (“[I]t is proper to take into account not only specific teachings of the references but also the

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Examiner’s basis for adding this reference to the combination of Taylor and Graham or Good. We select claim 1 as representative of the rejected claims.

inferences which one skilled in the art would reasonably be expected to draw therefrom . . . ”). The analysis supporting obviousness, however, should be made explicit and should “identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements” in the manner claimed. *KSR*, 127 S. Ct. at 1739.

Taylor, Graham, Good, and Gupta are all directed to thermal barrier coating for substrates utilized in gas turbine engines. Graham and Good both disclose the application of a porous (less dense) abradable outer layer to the more dense inner layer (Graham, col. 3, ll. 4-7; Good, col. 4, l. 66- col. 5, l. 10). Taylor, like Graham and Good, is directed to thermal barrier coating substrates utilized in gas turbine engines. As such, a person of ordinary skill in the art would have reasonably expected that the less dense ceramic abradable outer layer described by Graham and Good would have been suitable for use as an outer layer for the invention described by Taylor. It is noted that the outer less dense abradable ceramic coatings of Graham and Good and the invention described in the present specification comprise zirconia.

Appellants have not argued that Taylor does not describe an inner ceramic layer that is the same as the inner layer of the claimed multilayer ceramic coating. Appellants’ principal argument is that the secondary references, Graham, Good, and Gupta, do not make up for the deficiencies of Taylor. Appellants contend that Graham, Good, and Gupta do not recognize the claimed properties and are silent with respect to an outer layer that does not include vertical cracks and has a high speed tip-to-seal wear

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ratio of 0.1 or less.<sup>2</sup> The mere recitation of a property or characteristic not disclosed by the prior art does not necessarily confer patentability to a composition or a method of using that composition. *See In re Skoner*, 517 F.2d 947, 950 (CCPA 1975). Graham and Good both disclose the application of a porous ceramic (less dense) abradable outer layer to the more dense inner layer (Graham, col. 3, ll. 4-7; Good, col. 4, l. 66- col. 5, l. 10). Where, as here, the Examiner has established a reasonable basis that the property or characteristic recited in the claims would have been inherent in the prior art product, the burden of proof properly shifts to Appellants to show that this characteristic or property is not possessed by the prior art. *See In re Best*, 562 F.2d 1252, 1255 (CCPA 1977); *In re Spada*, 911 F.2d 705, 708 (Fed. Cir. 1990). However, Appellants have failed to meet their burden to establish that the claimed characteristics are not possessed by the porous ceramic (less dense) abradable outer layer of Graham and Good references. Appellants have not argued or directed us to evidence that establishes that the outer coatings of the Graham and Good references do not possess the argued properties.

We note Appellants have not relied upon evidence of unexpected results in rebuttal to the Examiner's *prima facie* case of obviousness.

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<sup>2</sup> Gupta was cited by the Examiner to address the surface roughness limitations of claim 26. Appellants have not presented arguments addressing the surface roughness. Appellants also have not presented arguments addressing the suitability of combining Gupta with Taylor and either Graham or Good.

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For the foregoing reasons and those stated in the Answer, we affirm all the rejections presented in this appeal.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED

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